IN THE SPECIFICATION

On page 2, please delete the paragraph beginning at line 10 and replace it with the following paragraph:

This application generally relates to data storage management, and more particularly to management related to copying or replication of data in a data storage environment.

On page 4, please delete the paragraph beginning at line 6 and replace it with the following paragraph:

It is known that it is desirable to copy or replicate data, including for a backup operation. Once data is replicated, copied, or otherwise backed up it may be used for a recovery or restoration process, wherein the copy of the data is restored back onto the source. This may be done for a variety of reasons including failures. So for example, data may be restored from the last good copy. However, the inventors of the present invention discussed below have critically recognized that it would be advantageous to protect such a last good copy itself from being corrupted during a recovery or restoration process.

On page 6, please delete the paragraph beginning at line 3 and replace it with the following paragraph:

The above and further advantages of the present invention may be better ~~under stood~~ understood by referring to the following description taken into conjunction with the accompanying drawings in which:

On page 9, please delete the content shown on page 9 and replace it with the following:

Terminology

Some terminology used herein is shown in here in Table 1:

Source: Typically a logical unit (LU) from where data is mirrored or copied, and which herein is sometimes referred to as being cloned.
Clone: Another LU, other than the Source LU, but which is a copy of the specified Source.
Clone Group: A collection of a Source and all of its Clones.
Sync Engine: A part of the Program Logic that copies data between a Source and a Clone
Synchronization: Process of updating the data contents of Clone with that of its Source, preferably performed by the Sync Engine
Reverse Synchronization (Reverse Sync) Process of updating the data contents of a Source from one of its Clones, preferably is performed by the Sync Engine
Extent: An extent is a number of contiguous data blocks on an LU that is represented by a specific amount of data, e.g. a bit in a map, e.g. a bitmap
Copy On Demand (COD): Process of copying a specific extent from the Clone to the Source, as occasionally required during a Protected Restore
COD Engine: A part of the Program Logic that coordinates and performs all COD.
Fracture: Process of logically disconnecting or discontinuing mirroring of data from the Source to a Clone (also known as splitting-off a Clone).
Delta Map: A map (e.g. a bitmap) that represents the extents that are different between the Clone and its Source.
COD Queue: This is a component of the Protected Restore that coordinates all the I/O requests that require data copied from the Clone LU to the Source LU before it can be processed.
COD Scoreboard: This is a component of the Protected Restore that allows the COD Engine and Sync Engine to coordinate which segments of the device are currently being copied either by the reverse-sync operation or by a COD operation.
Recovery Process: These are the steps that are performed to resume a Protected Restore that stopped because of a system failure (e.g., a re-boot). These steps are typically performed when the system boots up
Persistent Delta Map: The Delta Map stored on disk that is used for all the Clones in a Clone Group. It is used during a Recovery Process to fill the Delta Maps for all the Clones in a Clone Group.
Protected Restore Map: A map (e.g., a bitmap) used to track the extents of the Source LU that have been modified during a Protected Restore. This map is kept in memory as well as persistently for recovering from failures.

[[1:]]

On page 13, please delete the paragraph beginning at line 3 and replace it with the following paragraph:

Referring to Figs. 1 and 2[[.]] a Data Storage Environment 10 includes a Production Host 14 with an interface 17 that may be for example a graphical user interface (GUI) or command line interface (CLI). A user, or some form of automated process may invoke processes of the present invention through interface 17 and communication path 15, and such processes may include the Protected Restore feature discussed above. In general, in a preferred embodiment, when a user initiates a Protected Restore, discussed further with reference to Fig. 4 below, the Program Logic 34 which includes the Sync Engine 41 (Fig. 2) begins a reverse-sync along path 21 to copy data from the Data Copy or Clone 22 to the Production Data or Source 20 in memory 33. Although the Clone is shown on the same system as the Production Data, it may be located on another Data Storage System.

On page 13-14, please delete the paragraph beginning at line 20 and replace it with the following paragraph:

The Sync Engine uses the Delta Map 28 stored in memory 36 to preferably copy only the extents that are different between the Clone and its Source, and a Protected Restore Map 32 and also a Tracking Map 35 are used as described herein. The Sync Engine copies the required data, preferably, starting at the beginning of the Clone and working its way to the end of the LU. However, once the Protected Restore process has been initiated, the user may expect the data from the Clone to "instantly[[']]" appear on the Source (even if the Sync Engine has not copied the data yet). This "instant appearance" of data is accomplished via the Copy on Demand or COD Engine 43 of the Program Logic (Fig. 2).

On page 16, please delete the paragraph beginning at line 6 and replace it with the following paragraph:

Referring to Fig. 5, an exemplary embodiment is shown to further describe the operation of the invention. Production Host 14 includes interfaces 17a-[[17]]c involved with Host-write 1-3, respectively over communication path 15a-c, respectively to source 20, and wherein Reverse-Sync[[']]s are enabled over path 21 for Clone 22, and path 24 may also be used for operations.

On page 17, please delete the paragraph beginning at line 11 and replace it with the following paragraph:

During this operation, Host-write 1 ~~though~~ through interface 17a is received by the Source 20 over path 15a. This write request affects a data area on the Source LU that is represented by multiple (2) bits in the Clone's Delta Map (bits 6 and 7). Because bit 6 of Clone_1's Delta Map 28 is not set, no COD is required. However, the Host write request still cannot be processed at this time until bit 7 is checked. Because bit 7 of Clone_1's Delta Map 28 is set and the corresponding bit is not set in the Protected Restore Map 32, a COD is required. The COD Engine copies extent 7 from the Clone 22 to the Source 20.

On page 19, please delete the paragraph beginning at line 3 and replace it with the following paragraph:

Also, If Host Write 2 (shown at 17a of Fig. 9) is received after the Protected Restore has been resumed, a COD should not be performed even though the bits that represent the affected extents (bits 6 and 7) are set in the Clone's Delta Map 28. Doing so would also cause Host Write 1 to get overwritten, which would corrupt the data on the Source.[[.]]

On page 20, please delete the paragraph beginning at line 8 and replace it with the following paragraph:

If there are no required extents to be copied that are not already in progress, the I/O request remains in a COD Queue until the required extents (that are already in ~~progressed~~ progress) are copied. If there are extents that need to be copied that are not already in progress by either engine, a COD is performed and the corresponding bit is set in the COD Scoreboard.